



IFWO

**RAW SEQUENCE LISTING**  
**PATENT APPLICATION: US/10/647,268**

**DATE: 07/23/2004**  
**TIME: 16:47:20**

**Input Set : A:\Oosumi.ST25.txt**  
**Output Set: N:\CRF4\07232004\J647268.raw**

3 <110> APPLICANT: Oosumi et al., Teruko  
 5 <120> TITLE OF INVENTION: Solanum Bulbocastanum Late Blight Resistance Gene and Use  
 Thereof

7 <130> FILE REFERENCE: 0155.02  
 C--> 9 <140> CURRENT APPLICATION NUMBER: US/10/647,268

C--> 9 <141> CURRENT FILING DATE: 2003-08-20

9 <150> PRIOR APPLICATION NUMBER: 60/407,100

10 <151> PRIOR FILING DATE: 2002-08-29

12 <160> NUMBER OF SEQ ID NOS: 10

14 <170> SOFTWARE: PatentIn version 3.2

16 <210> SEQ ID NO: 1

17 <211> LENGTH: 3193

18 <212> TYPE: DNA

19 <213> ORGANISM: Solanum bulbocastanum

22 <220> FEATURE:

23 <221> NAME/KEY: CDS

24 <222> LOCATION: (52)..(3018)

26 <400> SEQUENCE: 1

**ENTERED**

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 28 Met Ala

29 1  
 31 gaa gct ttc ctt caa gtt ctg tta gac aat ctg act tgt ttc atc caa 105  
 32 Glu Ala Phe Leu Gln Val Leu Leu Asp Asn Leu Thr Cys Phe Ile Gln

33 5 10 15  
 35 ggg gaa ctt gga ttg att ctt ggt ttt aag gat gag ttc gaa aag ctt 153  
 36 Gly Glu Leu Gly Leu Ile Leu Gly Phe Lys Asp Glu Phe Glu Lys Leu

37 20 25 30  
 39 caa agc acg ttt act aca atc caa gct gtg cta gaa gat gct cag aag 201  
 40 Gln Ser Thr Phe Thr Thr Ile Gln Ala Val Leu Glu Asp Ala Gln Lys

41 35 40 45 50  
 43 aag caa ttg aag gac aag gca ata gaa aat ttg ttg cag aaa ctc aat 249  
 44 Lys Gln Leu Lys Asp Lys Ala Ile Glu Asn Trp Leu Gln Lys Leu Asn

45 55 60 65  
 47 gct gct gca tat gag gct gat gac atc ttg gac gaa tgt aaa act gag 297  
 48 Ala Ala Ala Tyr Glu Ala Asp Asp Ile Leu Asp Glu Cys Lys Thr Glu

49 70 75 80  
 51 gca cca att aga cag aag aac aaa tat ggg tgt tat cat cca aac 345  
 52 Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys Tyr His Pro Asn

53 85 90 95  
 55 gtt atc act ttt cgt cac aag att ggg aaa agg atg aaa aag att atg 393  
 56 Val Ile Thr Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys Ile Met

57 100 105 110  
 59 gag aaa cta gat gta att gca gcg gaa cga att aag ttt cat ttg gat 441  
 60 Glu Lys Leu Asp Val Ile Ala Ala Glu Arg Ile Lys Phe His Leu Asp

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61	115	120	125	130	
63	gaa agg act ata gag aga caa gtt gct aca cgc caa aca ggt ttt gtt				489
64	Glu Arg Thr Ile Glu Arg Gln Val Ala Thr Arg Gln Thr Gly Phe Val				
65	135	140	145		
67	ttg aat gaa cca caa gtt tat gga aga gac aaa gaa aag gac gag ata				537
68	Leu Asn Glu Pro Gln Val Tyr Gly Arg Asp Lys Glu Lys Asp Glu Ile				
69	150	155	160		
71	gtg aaa atc ctg ata aac aat gtt agc aat gcc caa aca ctt cca gtc				585
72	Val Lys Ile Leu Ile Asn Asn Val Ser Asn Ala Gln Thr Leu Pro Val				
73	165	170	175		
75	ctc cca ata ctt ggt atg ggg gga cta gga aag acg act ctt gcc caa				633
76	Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu Ala Gln				
77	180	185	190		
79	atg gtc ttc aat gat cag aga gta att gag cat ttc cat ccc aaa ata				681
80	Met Val Phe Asn Asp Gln Arg Val Ile Glu His Phe His Pro Lys Ile				
81	195	200	205	210	
83	tgg att tgt gtc tcg gaa gat ttt aat gag aag agg ttg ata aag gaa				729
84	Trp Ile Cys Val Ser Glu Asp Phe Asn Glu Lys Arg Leu Ile Lys Glu				
85	215	220	225		
87	att gta gaa tct att gaa gaa aag tca ctt ggt ggc atg gac ttg gct				777
88	Ile Val Glu Ser Ile Glu Glu Lys Ser Leu Gly Gly Met Asp Leu Ala				
89	230	235	240		
91	cca ctt caa aag aag ctt cgg gac ttg ctg aat gga aaa aaa tat ttg				825
92	Pro Leu Gln Lys Leu Arg Asp Leu Leu Asn Gly Lys Lys Tyr Leu				
93	245	250	255		
95	ctc gtc tta gat gat gtt tgg aat gaa gat caa gat aag tgg gct aag				873
96	Leu Val Leu Asp Asp Val Trp Asn Glu Asp Gln Asp Lys Trp Ala Lys				
97	260	265	270		
99	tta aga caa gtc ttg aag gtt gga gca agt ggc gct tct gtt cta acc				921
100	Leu Arg Gln Val Leu Lys Val Gly Ala Ser Gly Ala Ser Val Leu Thr				
101	275	280	285	290	
103	act act cgt ctt gaa aag gtt gga tca att atg gga aca ttg caa cca				969
104	Thr Thr Arg Leu Glu Lys Val Gly Ser Ile Met Gly Thr Leu Gln Pro				
105	295	300	305		
107	tat gaa ttg tca aat ttg tct caa gaa gat tgt tgg ttg ttc atg				1017
108	Tyr Glu Leu Ser Asn Leu Ser Gln Glu Asp Cys Trp Leu Leu Phe Met				
109	310	315	320		
111	caa cgt gca ttt ggg cac caa gaa ata aat ctt aat ctt gtg gct				1065
112	Gln Arg Ala Phe Gly His Gln Glu Glu Ile Asn Leu Asn Leu Val Ala				
113	325	330	335		
115	atc gga aag gag att gtg aaa aaa tgt ggt ggt cct cta gca gct				1113
116	Ile Gly Lys Glu Ile Val Lys Lys Cys Gly Gly Val Pro Leu Ala Ala				
117	340	345	350		
119	aaa act ctt gga ggt att ttg cgc ttt aag aga gaa gaa aga cag tgg				1161
120	Lys Thr Leu Gly Gly Ile Leu Arg Phe Lys Arg Glu Glu Arg Gln Trp				
121	355	360	365	370	
123	gaa cat gtg aga gat agt gag att tgg aaa ttg cct caa gaa gaa agt				1209
124	Glu His Val Arg Asp Ser Glu Ile Trp Lys Leu Pro Gln Glu Glu Ser				
125	375	380	385		

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127 tct att ctg cct gcc ctg aga ctt agt tac cat cac ctt cca ctt gat	1257
128 Ser Ile Leu Pro Ala Leu Arg Leu Ser Tyr His His Leu Pro Leu Asp	
129 390 395 400	
131 ttg aga caa tgc ttt aca tat tgt gca gta ttc cca aag gat acc gaa	1305
132 Leu Arg Gln Cys Phe Thr Tyr Cys Ala Val Phe Pro Lys Asp Thr Glu	
133 405 410 415	
135 atg gaa aag gga aat cta atc tct ctc tgg atg gca cat ggt ttt att	1353
136 Met Glu Lys Gly Asn Leu Ile Ser Leu Trp Met Ala His Gly Phe Ile	
137 420 425 430	
139 tta tcg aaa gga aac ttg gag cta gag aat gta ggt aat gaa gta tgg	1401
140 Leu Ser Lys Gly Asn Leu Glu Leu Glu Asn Val Gly Asn Glu Val Trp	
141 435 440 445 450	
143 aat gaa tta tac ttg agg tct ttc caa gag att gaa gtt aaa tct	1449
144 Asn Glu Leu Tyr Leu Arg Ser Phe Phe Gln Glu Ile Glu Val Lys Ser	
145 455 460 465	
147 ggt caa act tat ttc aag atg cat gat ctc att cat gat ctg gca aca	1497
148 Gly Gln Thr Tyr Phe Lys Met His Asp Leu Ile His Asp Leu Ala Thr	
149 470 475 480	
151 tct cta ttt tcg gca agc aca tca agc agc aat atc cga gaa ata att	1545
152 Ser Leu Phe Ser Ala Ser Thr Ser Ser Asn Ile Arg Glu Ile Ile	
153 485 490 495	
155 gta gaa aat tac ata cat atg atg tcc att ggt ttc act aaa gtg gta	1593
156 Val Glu Asn Tyr Ile His Met Met Ser Ile Gly Phe Thr Lys Val Val	
157 500 505 510	
159 tct tct tac tct ctt tcc cac ttg cag aag ttt gtc tcg ttg agg gtg	1641
160 Ser Ser Tyr Ser Leu Ser His Leu Gln Lys Phe Val Ser Leu Arg Val	
161 515 520 525 530	
163 ctt aat cta agt gac ata aaa ctt aag cag tta ccg tct tcc att gga	1689
164 Leu Asn Leu Ser Asp Ile Lys Leu Lys Gln Leu Pro Ser Ser Ile Gly	
165 535 540 545	
167 gat cta gta cat tta aga tac cta aac ttg tct ggc aat act agt att	1737
168 Asp Leu Val His Leu Arg Tyr Leu Asn Leu Ser Gly Asn Thr Ser Ile	
169 550 555 560	
171 cgt agt ctt cca aac cag tta tgc aag ctt caa aat ctg cag act ctt	1785
172 Arg Ser Leu Pro Asn Gln Leu Cys Lys Leu Gln Asn Leu Gln Thr Leu	
173 565 570 575	
175 gat cta cat ggc tgt cat tca ctt tgt tgt ttg cca aaa gaa aca agc	1833
176 Asp Leu His Gly Cys His Ser Leu Cys Cys Leu Pro Lys Glu Thr Ser	
177 580 585 590	
179 aaa ctt ggt agt ctt cga aat ctt tta ctt gat ggt tgc tat gga ttg	1881
180 Lys Leu Gly Ser Leu Arg Asn Leu Leu Asp Gly Cys Tyr Gly Leu	
181 595 600 605 610	
183 act tgt atg cca cca agg ata gga tct ttg aca tgc ctt aag act cta	1929
184 Thr Cys Met Pro Pro Arg Ile Gly Ser Leu Thr Cys Leu Lys Thr Leu	
185 615 620 625	
187 agt aga ttt gtg gtg gga att cag aag aaa agt tgt caa ctt ggt gaa	1977
188 Ser Arg Phe Val Val Gly Ile Gln Lys Lys Ser Cys Gln Leu Gly Glu	
189 630 635 640	
191 tta cga aac ctg aat ctc tat ggc tca att gaa atc acg cat ctt gag	2025

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192	Leu	Arg	Asn	Leu	Asn	Leu	Tyr	Gly	Ser	Ile	Glu	Ile	Thr	His	Leu	Glu	
193		645				650					655						
195	aga	gtg	aag	aat	gat	atg	gat	gca	aaa	gaa	gcc	aat	tta	tct	gca	aaa	2073
196	Arg	Val	Lys	Asn	Asp	Met	Asp	Ala	Lys	Glu	Ala	Asn	Leu	Ser	Ala	Lys	
197		660				665					670						
199	gaa	aat	ctg	cat	tct	tta	agc	atg	aaa	tgg	gat	gac	gat	gaa	cgt	cca	2121
200	Glu	Asn	Leu	His	Ser	Leu	Ser	Met	Lys	Trp	Asp	Asp	Asp	Glu	Arg	Pro	
201	675		680						685						690		
203	cgt	ata	tat	gaa	tca	gaa	aaa	gtt	gaa	gtg	ctt	gaa	gct	ctc	aaa	cca	2169
204	Arg	Ile	Tyr	Glu	Ser	Glu	Lys	Val	Glu	Val	Leu	Glu	Ala	Leu	Lys	Pro	
205		695				700					705						
207	cac	tcc	aat	ctg	act	tgt	tta	aca	atc	agg	ggc	ttc	aga	gga	atc	cgt	2217
208	His	Ser	Asn	Leu	Thr	Cys	Leu	Thr	Ile	Arg	Gly	Phe	Arg	Gly	Ile	Arg	
209		710							715				720				
211	ctc	cca	gac	tgg	atg	aat	cac	tca	gtt	ttg	aaa	aat	gtt	gtc	tct	att	2265
212	Leu	Pro	Asp	Trp	Met	Asn	His	Ser	Val	Leu	Lys	Asn	Val	Val	Ser	Ile	
213		725				730					735						
215	gaa	atc	atc	agt	tgc	aaa	aac	tgc	tca	tgc	tta	cca	ccc	ttt	ggt	gag	2313
216	Glu	Ile	Ile	Ser	Cys	Lys	Asn	Cys	Ser	Cys	Leu	Pro	Pro	Phe	Gly	Glu	
217		740				745					750						
219	ctg	cct	tgt	cta	aaa	agt	cta	gag	ttg	tgg	agg	ggg	tct	gcg	gaa	gtg	2361
220	Leu	Pro	Cys	Leu	Lys	Ser	Leu	Glu	Leu	Trp	Arg	Gly	Ser	Ala	Glu	Val	
221	755		760						765						770		
223	gag	tat	gtt	gat	tct	gga	ttc	cct	aca	aga	aga	agg	ttt	cca	tct	ctg	2409
224	Glu	Tyr	Val	Asp	Ser	Gly	Phe	Pro	Thr	Arg	Arg	Arg	Phe	Pro	Ser	Leu	
225		775				780					785						
227	aga	aaa	ctt	aat	ata	cgc	gaa	ttt	ggt	aat	ctg	aaa	gga	ttg	ctg	aaa	2457
228	Arg	Lys	Leu	Asn	Ile	Arg	Glu	Phe	Gly	Asn	Leu	Lys	Gly	Leu	Leu	Lys	
229		790				795					800						
231	aag	gaa	gaa	gag	caa	tgc	cct	gtg	ctt	gaa	gag	ata	gag	att	aaa		2505
232	Lys	Glu	Gly	Glu	Glu	Gln	Cys	Pro	Val	Leu	Glu	Ile	Glu	Ile	Lys		
233		805				810					815						
235	tgt	tgc	cct	atg	ttt	gtt	att	cca	acc	ctt	tct	tct	gtc	aag	aaa	ttg	2553
236	Cys	Cys	Pro	Met	Phe	Val	Ile	Pro	Thr	Leu	Ser	Ser	Val	Lys	Lys	Leu	
237		820				825					830						
239	gta	gtt	agt	ggg	gac	aag	tca	gat	gca	ata	ggt	ttc	agt	tcc	ata	tct	2601
240	Val	Val	Ser	Gly	Asp	Lys	Ser	Asp	Ala	Ile	Gly	Phe	Ser	Ser	Ile	Ser	
241	835		840						845						850		
243	aat	ctc	atg	gct	ttt	act	tcc	ctc	caa	att	cgc	tat	aac	aaa	gaa	gat	2649
244	Asn	Leu	Met	Ala	Leu	Thr	Ser	Leu	Gln	Ile	Arg	Tyr	Asn	Lys	Glu	Asp	
245		855				860					865						
247	gct	tca	ctc	cca	gaa	gag	atg	ttc	aaa	agc	ctt	gca	aat	ctc	aaa	tac	2697
248	Ala	Ser	Leu	Pro	Glu	Glu	Met	Phe	Lys	Ser	Leu	Ala	Asn	Leu	Lys	Tyr	
249		870				875					880						
251	ttg	aat	atc	tct	ttt	tac	ttc	aat	ctt	aaa	gag	ctg	cct	acc	agc	ctg	2745
252	Leu	Asn	Ile	Ser	Phe	Tyr	Phe	Asn	Leu	Lys	Glu	Leu	Pro	Thr	Ser	Leu	
253		885				890					895						
255	gct	agt	ctc	aat	gct	ttg	aag	cat	ctg	gaa	att	cat	agt	tgt	tat	gca	2793
256	Ala	Ser	Leu	Asn	Ala	Leu	Lys	His	Leu	Glu	Ile	His	Ser	Cys	Tyr	Ala	

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259	ctt gag agt ctc ccc gag gaa ggt gtg aaa ggt tta att tca ctc aca			2841
260	Leu Glu Ser Leu Pro Glu Glu Gly Val Lys Gly Leu Ile Ser Leu Thr			
261	915	920	925	930
263	cag tta tcc ata aca tac tgt gaa atg cta caa tgt tta ccg gag gga			2889
264	Gln Leu Ser Ile Thr Tyr Cys Glu Met Leu Gln Cys Leu Pro Glu Gly			
265	935	940	945	
267	ttg cag cac cta aca gcc ctc aca aat tta tca gtt gag ttt tgt cca			2937
268	Leu Gln His Leu Thr Ala Leu Thr Asn Leu Ser Val Glu Phe Cys Pro			
269	950	955	960	
271	aca ctg gcc aag cgg tgt gag aag gga ata gga gaa gac tgg tac aaa			2985
272	Thr Leu Ala Lys Arg Cys Glu Lys Gly Ile Gly Glu Asp Trp Tyr Lys			
273	965	970	975	
275	att gct cac att cct cgt gtg ttt att tat tag tattccaat tagatgtaat			3038
276	Ile Ala His Ile Pro Arg Val Phe Ile Tyr			
277	980	985		
279	tttctgattt tcttttgaa acaaataaac tatttgcgtt atcttattgt attataacttg			3098
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286	<210> SEQ ID NO: 2			
287	<211> LENGTH: 988			
288	<212> TYPE: PRT			
289	<213> ORGANISM: Solanum bulbocastanum			
291	<400> SEQUENCE: 2			
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298	20	25	30	
301	Lys Leu Gln Ser Thr Phe Thr Ile Gln Ala Val Leu Glu Asp Ala			
302	35	40	45	
305	Gln Lys Lys Gln Leu Lys Asp Lys Ala Ile Glu Asn Trp Leu Gln Lys			
306	50	55	60	
309	Leu Asn Ala Ala Ala Tyr Glu Ala Asp Asp Ile Leu Asp Glu Cys Lys			
310	65	70	75	80
313	Thr Glu Ala Pro Ile Arg Gln Lys Lys Asn Lys Tyr Gly Cys Tyr His			
314	85	90	95	
317	Pro Asn Val Ile Thr Phe Arg His Lys Ile Gly Lys Arg Met Lys Lys			
318	100	105	110	
321	Ile Met Glu Lys Leu Asp Val Ile Ala Ala Glu Arg Ile Lys Phe His			
322	115	120	125	
325	Leu Asp Glu Arg Thr Ile Glu Arg Gln Val Ala Thr Arg Gln Thr Gly			
326	130	135	140	
329	Phe Val Leu Asn Glu Pro Gln Val Tyr Gly Arg Asp Lys Glu Lys Asp			
330	145	150	155	160
333	Glu Ile Val Lys Ile Leu Ile Asn Asn Val Ser Asn Ala Gln Thr Leu			
334	165	170	175	
337	Pro Val Leu Pro Ile Leu Gly Met Gly Gly Leu Gly Lys Thr Thr Leu			
338	180	185	190	
341	Ala Gln Met Val Phe Asn Asp Gln Arg Val Ile Glu His Phe His Pro			

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L:9 M:270 C: Current Application Number differs, Replaced Current Application No  
L:9 M:271 C: Current Filing Date differs, Replaced Current Filing Date  
L:614 M:361 W: Invalid Split Codon, Sequence data for SEQ ID#: 3

**STATISTICS SUMMARY**

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Application Serial Number: US/10/647,268

Alpha or Numeric or Xml: Numeric

Application Class:

Application File Date: 08-20-2003

Art Unit: IFWO

Software Application: PatentIN3.2

Total Number of Sequences: 10

Total Nucleotides: 18385

Total Amino Acids: 4967

Number of Errors: 0

Number of Warnings: 1

Number of Corrections: 2

**MESSAGE SUMMARY**

270 C: 1 (Current Application Number differs)

271 C: 1 (Current Filing Date differs)

361 W: 1 (Invalid Split Codon)